Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>03</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>*04/09/2001*</u> .

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on
> sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Sfarti et al. (USPN

5515484), hereinafter simply Sfarti.

2.   In regard to claim 1, 16, Sfarti teaches a method for rendering, on a volumetric display

having a plurality of voxels, a rasterized line that approximates a desired line, said method

comprising: positioning a screen at a first angular position in which said screen is coplanar with

an entry plane; see col.4 lines 30-36, selecting a first voxel (subrod of voxels) corresponding to

an intersection of said desired line with said entry plane; selecting a second voxel (subrod of

voxels) corresponding to a projection onto said entry plane of an intersection of said desired line

with an exit plane intersecting said entry plane; see col.9 lines 20-30; defining a connecting

segment that connects said first voxel and said second voxel; see col.9 lines 63-67; and rendering

selected voxels on said screen to rasterize said connecting segment; see col.10 lines 1-9.

3.   In regard to claims 2, 17, Sfarti teaches a method for rendering, on a volumetric display

having a plurality of voxels, a rasterized line that approximates a desired line, wherein rendering

said selected voxels comprises uniformly illuminating said selected voxels. See col.10 lines 1-9.

4.   In regard to claims 3, 18, Sfarti teaches a method for rendering, on a volumetric display

having a plurality of voxels, a rasterized line that approximates a desired line, wherein rendering

said selected voxels comprises rendering said selected voxels according to a selected

illumination pattern. See col.10 lines 1-9.

5. In regard to claims 4, 19, Sfarti teaches a method for rendering, on a volumetric display

having a plurality of voxels, a rasterized line that approximates a desired line, further comprising

selecting said illumination pattern to assign an illumination level of at least one of said selected

voxels to be substantially zero. See col.9 lines 50-57.

6. In regard to claims 5, 20, Sfarti teaches a method for rendering, on a volumetric display

having a plurality of voxels, a rasterized line that approximates a desired line, further comprising

selecting said at least one of said selected voxels from a group consisting of said first voxel and

said second voxel. see col.9 lines 20-30.

7. In regard to claims 6, 21, Sfarti teaches a method for rendering, on a volumetric display

having a plurality of voxels, a rasterized line that approximates a desired line, further comprising

continuing to render said selected voxels while rotating said screen from a first angular position

in which said screen is coplanar with said entry plane to a second angular position in which said

screen is coplanar with said exit plane (renderin voxel rod from back to front and front to back).

See col.9 lines 35-55.

8. In regard to claims 7, 22, Sfarti teaches a method for rendering, on a volumetric display

having a plurality of voxels, a rasterized line that approximates a desired line, wherein selecting

said first voxel comprises: obtaining constants that define said line in Cartesian coordinates;

obtaining an angle descriptive of said angular position of said entry plane; and on the basis of

said constants and said angle, performing a trigonometric to transformation to determine

cylindrical coordinates of said intersection of said desired line with said entry plane. See col.10 lines 1-10.

9.   In regard to claims 8, 23, Sfarti teaches a method for rendering, on a volumetric display having a plurality of voxels, a rasterized line that approximates a desired line, wherein performing said trigonometric transformation comprises obtaining a value of a trigonometric function of an argument from a look-up table. See col.7 lines 35-41.

10.   In regard to claims 9, 24, Sfarti teaches a method for rendering, on a volumetric display having a plurality of voxels, a rasterized line that approximates a desired line, further comprising generating rotated coordinates corresponding to said first voxel, said rotated coordinates corresponding to rotation about a selected angle. See col.9 lines 35-55.

11.   In regard to claims 10, 25 Sfarti teaches a method for rendering, on a volumetric display having a plurality of voxels, a rasterized line that approximates a desired line, further comprising projecting said rotated coordinates to correct for keystoning. See col.9 lines 15-17.

12.   In regard to claims 11, 26, Sfarti teaches a method for rendering, on a volumetric display having a plurality of voxels, a rasterized line that approximates a desired line, further comprising generating projected coordinates corresponding to said first voxel, said projected coordinates being obtained by correction for keystone distortion. See col.9 lines 15-17.

13.   In regard to claims 12, Sfarti teaches a method for rendering, on a volumetric display having a plurality of voxels, a rasterized line that approximates a desired line, wherein said look-up table has a number of entries that is at least double the number of angular positions at which said screen can be positioned. See col.7 lines 35-41.

14.   In regard to claims 13, 27, Sfarti teaches a method for rendering, on a volumetric display

having a plurality of voxels, a rasterized line that approximates a desired line, wherein rendering

said selected voxels on said screen comprises applying a Bresenham algorithm to obtain said

selected voxels on the basis of said intersection of said desired line with said entry plane and said

projection onto said entry plane of an intersection of said desired line with an exit plane. See

col.31 lines 1-20.

15.   In regard to claims 14, 28, Sfarti teaches a method for rendering, on a volumetric display

having a plurality of voxels, a rasterized line that approximates a desired line, further

comprising: providing a first processor dedicated to carrying out said rendering of selected

voxels on said screen to rasterize said connecting segment; and providing a second processor in

communication with said first processor to provide said first processor with information

indicative of said desired line. See col.10 lines 1-15.

16.   In regard to claims 15, 29, Sfarti teaches a method of rendering a desired line in a

volumetric display having a rotatable screen, said method comprising: stepping said rotatable

screen through a sequence of angular positions; and at each angular position, rendering, on said

rotatable screen, a rasterized approximation of a line segment containing an intersection of said

desired line and said rotatable screen (renderin voxel rod from back to front and front to back).

See col.9 lines 35-55.

<div align="center">*Conclusion*</div>

17.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to **Tam D. Tran** whose telephone number is **703-305-4196**. The

examiner can normally be reached on MON-FRI from 8:30 – 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, **Matthew Bella** can be reached on **703-308-6829**.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered response should be brought to Crystal Park II, 2121 Crystal Drive,

Arlington, VA, Sixth floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the Technology Center 2600 Customer Service Office whose

telephone number is (703) 306-0377.

Tam Tran
T T
Examiner

Art unit 2676

MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600